

AMENDMENTS TO THE CLAIMS

We claim:

Claim 1 (currently amended): A process for preparing acid formates ~~which comprises~~  
comprising:

- (a) partially hydrolyzing methyl formates with water;
- (b) separating off by distillation methyl formate and methanol from the reaction mixture obtained in process stage (a), forming a stream comprising formic acid and water; and
- (c) combining the stream comprising formic acid and water from the process stage (b) with the corresponding formate forming a mixture comprising the acid formate and water.

Claim 2 (currently amended): A process according to ~~as claimed in~~ claim 1, wherein, in the process stage (a), the methyl formate and the water are fed in a molar ratio of 0.1 to 1.

Claim 3 (currently amended): A process according to claim 1 ~~as claimed in claims 1 to 2~~, wherein the methyl formate separated off in process stage (b) is recirculated to process stage (a).

Claim 4 (currently amended): A process according to claim 1 ~~as claimed in claims 1 to 3~~, wherein, in the process stage (d):

- (i) the stream comprising the formic acid and the water from the process stage (b), together with the mother liquor recirculated from step (iv), is concentrated in a column or an evaporator with removal of water by distillation;
- (ii) the stream which was produced from step (i) by concentration and comprises formic acid, water and formate is combined with the corresponding formate, forming a mixture comprising the acid formate and water;
- (iii) solid acid formate from the mixture comprising acid formate and water obtained from step (ii) is precipitated by crystallization and this is isolated; and
- (iv) the resultant mother liquor is recirculated to step (i).



Claim 5 (currently amended): A process according to claim 1 ~~as claimed in claims 1 to 3~~, wherein, in process stage (c):

- (i) the stream from the process stage (b) comprising the formic acid and the water and the corresponding formate are combined to form a mixture comprising the acid formate and water in a column or an evaporator with removal of water by distillation; and
- (ii) solid acid formate is separated off by spray granulation, spray drying or melt crystallization from the mixture obtained from step (i) comprising acid formate and water, and this solid acid formate is isolated.

Claim 6 (currently amended): A process according to claim 1 ~~as claimed in claims 1 to 5~~, wherein the acid formate prepared is an acid metal formate and the metal formate to be supplied in process stage (c) is produced by carbonylating the corresponding metal hydroxide.

Claim 7 (currently amended): A process according to ~~as claimed in~~ claim 6, wherein:

- (i) the carbonylation is carried out in the presence of methanol as catalyst;
- (ii) the resultant reaction mixture comprising metal formate, water and methanol together with the stream comprising methanol with or without methyl formate from the process stage (b) is separated by distillation into a stream comprising methanol, with or without a stream comprising methyl formate and a stream comprising the metal formate and water; and
- (iii) the resultant stream comprising the metal formate and water is fed to the process stage (c).

Claim 8 (currently amended): A process according to claim 1 ~~as claimed in claims 1 to 7~~, wherein the acid formate prepared is selected from the group consisting of acid potassium formate, acid sodium formate, acid calcium formate and ~~or~~ mixtures thereof.

Claim 9 (currently amended): A process according to claim 1 ~~as claimed in claims 1 to 8~~, wherein the acid formate prepared is selected from the group consisting of potassium diformate, sodium diformate, sodium tetraformate and ~~or~~ mixtures thereof.

Claim 10 (currently amended): An apparatus for preparing acid formates according to claim 1 ~~as claimed in claims 1 to 9~~, comprising:



- (a) a reactor (A) suitable for hydrolyzing methyl formate;
- (b) a column (B) suitable for separating by distillation a stream comprising methyl formate, formic acid, methanol and water into methyl formate, methanol and a stream comprising formic acid and water, which column is connected on the feed side to the reactor (A);
- (c) a column (E) suitable for removing water from a stream comprising formic acid and water, which column is connected on the feed side to the column bottom of column (B);
- (d) an apparatus (G) suitable for crystallizing acid formate, which apparatus is connected on the feed side to the column bottom of column (E) and to a possible supply of aqueous formate;
- (f) an apparatus (F) suitable for separating off crystals of the acid formate, which apparatus is connected on the feed side to apparatus (G); and
- (g) a connection line (17) between apparatus (F) and column (E), which connection line is suitable for recirculating mother liquor.

Claim 11 (currently amended): An apparatus for preparing acid formates according to claim 1 as claimed in claims 1 to 9, comprising:

- (a) a reactor (A) suitable for hydrolyzing methyl formate;
- (b) a column (B) suitable for separating by distillation a stream comprising methyl formate, formic acid, methanol and water into methyl formate, methanol and a stream comprising formic acid and water, which column is connected on the feed side to the reactor (A);
- (c) a column (E) suitable for removing water from a stream comprising formic acid and water, which column is connected on the feed side to the column bottom of column (B);
- (e) a possible supply to the column (E), which possible supply is suitable for feeding aqueous formate; and
- (f) an apparatus (G) suitable for spray granulation, spray drying or melt crystallization, which apparatus is connected on the feed side to the column bottom of column (E).



Claim 12 (new): A process according to claim 2, wherein the methyl formate separated off in process stage (b) is recirculated to process stage (a).

Claim 13 (new): A process according to claim 2, wherein, in the process stage (d):

- (i) the stream comprising the formic acid and the water from the process stage (b), together with the mother liquor recirculated from step (iv), is concentrated in a column or an evaporator with removal of water by distillation;
- (ii) the stream which was produced from step (i) by concentration and comprises formic acid, water and formate is combined with the corresponding formate, forming a mixture comprising the acid formate and water;
- (iii) solid acid formate from the mixture comprising acid formate and water obtained from step (ii) is precipitated by crystallization and this is isolated; and
- (iv) the resultant mother liquor is recirculated to step (i).

Claim 14 (new): A process according to claim 3, wherein, in the process stage (d):

- (i) the stream comprising the formic acid and the water from the process stage (b), together with the mother liquor recirculated from step (iv), is concentrated in a column or an evaporator with removal of water by distillation;
- (ii) the stream which was produced from step (i) by concentration and comprises formic acid, water and formate is combined with the corresponding formate, forming a mixture comprising the acid formate and water;
- (iii) solid acid formate from the mixture comprising acid formate and water obtained from step (ii) is precipitated by crystallization and this is isolated; and
- (iv) the resultant mother liquor is recirculated to step (i).

Claim 15 (new): A process according to claim 2, wherein, in process stage (c):

- (i) the stream from the process stage (b) comprising the formic acid and the water and the corresponding formate are combined to form a mixture comprising the acid formate and water in a column or an evaporator with removal of water by



distillation; and

- (ii) solid acid formate is separated off by spray granulation, spray drying or melt crystallization from the mixture obtained from step (i) comprising acid formate and water, and this solid acid formate is isolated.

Claim 16 (new): A process according to claim 3, wherein, in process stage (c):

- (i) the stream from the process stage (b) comprising the formic acid and the water and the corresponding formate are combined to form a mixture comprising the acid formate and water in a column or an evaporator with removal of water by distillation; and
- (ii) solid acid formate is separated off by spray granulation, spray drying or melt crystallization from the mixture obtained from step (i) comprising acid formate and water, and this solid acid formate is isolated.

Claim 17 (new): A process according to claim 2, wherein the acid formate prepared is an acid metal formate and the metal formate to be supplied in process stage (c) is produced by carbonylating the corresponding metal hydroxide.

Claim 18 (new): A process according to claim 3, wherein the acid formate prepared is an acid metal formate and the metal formate to be supplied in process stage (c) is produced by carbonylating the corresponding metal hydroxide.

Claim 19 (new): A process according to claim 4, wherein the acid formate prepared is an acid metal formate and the metal formate to be supplied in process stage (c) is produced by carbonylating the corresponding metal hydroxide.

Claim 20 (new): A process according to claim 5, wherein the acid formate prepared is an acid metal formate and the metal formate to be supplied in process stage (c) is produced by carbonylating the corresponding metal hydroxide.